

CLAIMS:

1. Startup circuit (30) for a power supply (44), said startup circuit comprising:
an input (31) for connecting a source of high voltage thereto,
an output rail (33) for feeding rectified voltage to the power supply,
5 a first energy storage device (35) coupled to the output rail for storing energy when voltage is first applied to the input,
a second energy storage device (37) coupled to an output of the power supply for storing energy when a voltage appearing at the output of the power supply reaches substantially steady state, and
10 a switching circuit (36, 50) coupled to the first energy storage device and to the second energy storage device and being responsive to the first energy storage device having sufficient energy for transferring said energy to the second energy storage device and disconnecting the first energy storage device from the output rail.
- 15 2. The startup circuit according to Claim 1, wherein the first energy storage device is a first capacitor (35).
3. The startup circuit according to Claim 1 or 2, wherein the second energy storage device is a second capacitor (37).
4. The startup circuit according to Claim 2 or 3, including:
20 a current source (34) connected to the input for charging the first capacitor, and
a first comparator (38) having a first input (39) coupled to an output of the first capacitor (35) and having a second input (40) connected to a first reference voltage (VR1) for generating a first switching signal when the output of the first
25 capacitor exceeds the first reference voltage;
a second comparator (41) having a first input (42) coupled to an output of the second capacitor (37) and having a second input (43) connected to a second reference voltage (VR2) for generating a second switching signal when the output of the second capacitor exceeds the second reference voltage;

– 12 –

said switching circuit (36, 50) being responsive to the first switching signal for changing from an initially open circuit wherein the first capacitor is isolated from the second capacitor to a closed circuit whereby the first capacitor is connected in parallel with the second capacitor; and being responsive to the second
5 switching signal for disabling charge flow to the first capacitor.

5. The startup circuit according to Claim 4, wherein the switching circuit (36, 50) includes:

a first switch (50) coupled to the current source and having an initial state wherein the current source is coupled to the first capacitor and having a second
10 state wherein the current source is decoupled from the first capacitor, and

a second normally open switch (36) coupled between respective outputs of the first and second capacitors.

6. The startup circuit according to Claim 5, wherein the first and second switches include semiconductor devices (Q1, Q4).

15 7. The startup circuit according to Claim 6, wherein the first and second switches are bipolar junction transistors (Q1, Q4).

8. The startup circuit according to any one of Claims 4 to 7, wherein the first comparator (38) includes a zener diode (D3).

9. The startup circuit according to any one of Claims 4 to 8, wherein the
20 second comparator (41) includes a zener diode (D1).

10. The startup circuit according to any one of Claims 4 to 9, wherein the current source (34) includes a transistor (Q2) for feeding current through a resistor (R5).

11. The startup circuit according to any one of Claims 4 to 10, wherein the
25 switching circuit (36) includes a first switch (50) comprising resistors (R1, R2, R3, R4) in combination with a transistor (Q1) for controlling the current source (34).

12. The startup circuit according to any one of Claims 4 to 11, wherein the switching circuit includes a second switch (36) comprising resistors (R8, R9) in combination with a transistor (Q4).

– 13 –

13. A power supply including the startup circuit according to any one of Claims 1 to 12.
14. The power supply according to Claim 13, being an integral unit.
15. The power supply according to Claim 13 or 14, being part of an LED
5 lighting system.
16. The power supply according to any one of Claims 13 to 15, including a power factor correction circuit.